Review of 2018 RTEP Assumptions Update

Transmission Expansion Advisory Committee

March 8, 2018

- Project S1094 (AEP portion of Duff-Rockport-Coleman project that interconnects AEP's Rockport station to MISO's Duff-Coleman project)
  - Placed on hold – See letter from AEP dated February 20, 2018 which has been posted for March 8, 2018 TEAC
  - AEP portion of project will not be modeled on-line in the 2018 RTEP

- PJM 2018 scenario and sensitivity discussion:
  - Light load scenario and sensitivity studies including a minimum load level study to support the development of light load test
  - Gas / Electric interface studies

- Scenarios under review based on stakeholder input
  - At-Risk Generation Scenario
    - Include nuclear units or generation at risk of retiring before 8 year period is up
  - EHV Transformer Replacement
    - Study congestion impacts with the EHV transformer replacements
  - Extreme Weather Scenario
    - PJM does not believe this is necessary due to our current review of weather information

Questions?

- V1 – 1/5/2018 – Original Slides Posted

- V2 – 1/9/2018 – Added slide 16 – Scenario and Sensitivity Analysis

- V3 – 3/8/2018 – Added slide 2 and 4, created appendix of all previously presented assumptions from V1 and V2

Appendix

(The following material was presented at previous TEAC meetings)

- Update of standard RTEP assumptions
- 2018 RTEP
  - TPL-001-4
- Modeling
  - MOD-032 (GOs and TOs)
    - http://pjm.com/planning/rtep-development/powerflow-cases/mod-032.aspx
    - Siemens PSS®MOD - Model On Demand (TOs)
    - PJM.com Planning Center Online Tool (Gen Model) – GOs
- RTEP Proposal Windows

- ## Load Flow Modeling
  - Power flow models for outside world load, capacity, and topology will be based on the following 2017 Series MMWG power flow cases
    - 2017 Series 2022SUM MMWG outside world for
      - 2018 Series 2023SUM RTEP, 2021SUM RTEP
    - 2017 Series 2022SLL MMWG outside world for
      - 2018 Series 2023LL RTEP
    - 2017 Series 2022WIN MMWG outside world for
      - 2018 Series 2023WIN RTEP
  - PJM reached out to neighbors to any updates to topology/corrections
  - PJM topology for all cases sourced from Model On Demand
    - Include all PJM Board approved upgrades through the December 2017 PJM Board of Manager approvals as well as all anticipated February 2018 PJM Board approvals
  - OVEC will be included as a part of PJM

- ## Includes the existing 27 LDAs

- ## Total of 27 LDAs
  - All 27 to be evaluated for the 2021/2022 delivery year RPM base residual auction planning parameters
  - Also to be evaluated for the 2021 and 2023 Summer RTEP case

LDA	Description
EMAAC	Global area - PJM 500, JCPL, PECO, PSEG, AE, DPL, RECO
SWMAAC	Global area - BGE and PEPCO
MAAC	Global area - PJM 500, Penelec, Meted, JCPL, PPL, PECO, PSEG, BGE, Pepco, AE, DPL, UGI, RECO
PPL	PPL & UGI
PJM WEST	APS, AEP, Dayton, DUQ, Comed, ATSI, DEO&K, EKPC, Cleveland, OVEC
WMAAC	PJM 500, Penelec, Meted, PPL, UGI
PENELEC	Pennsylvania Electric
METED	Metropolitan Edison
JCPL	Jersey Central Power and Light
PECO	PECO
PSEG	Public Service Electric and Gas
BGE	Baltimore Gas and Electric
PEPCO	Potomac Electric Power Company
AE	Atlantic City Electric
DPL	Delmarva Power and Light
DPLSOUTH	Southern Portion of DPL
PSNORTH	Northern Portion of PSEG
VAP	Dominion Virginia Power
APS	Allegheny Power
AEP	American Electric Power
DAYTON	Dayton Power and Light
DLCO	Duquesne Light Company
Comed	Commonwealth Edison
ATSI	American Transmission Systems, Incorporated
DEO&K	Duke Energy Ohio and Kentucky
EKPC	Eastern Kentucky Power Cooperative
Cleveland	Cleveland Area

- **Firm Commitments**

  – Long term firm transmission service consistent with those coordinated between PJM and other Planning Coordinators during the 2017 Series MMWG development

- **Outage Rates**

  – Generation outage rates will be based on the most recent Reserve Requirement Study (RRS) performed by PJM

  – Generation outage rates for future PJM units will be estimated based on class average rates

- # Generic EEFORd values developed for 2023 RTEP base case
  - To be posted with TEAC materials

- # Capacity weighted by fuel type
  - Each unit within a given generator class is assigned the average EEFORd for that class

GEN CLASS	MW	Avg EEFORD
Fossil Steam	73,006	9.74%
Nuclear	34,074	2.16%
Combustion Turbine	27,414	9.45%
Combined Cycle	48,164	5.09%
Hydro	3,047	7.62%
Pumped Storage	5,597	3.35%
Diesel	1,056	13.17%
Wind*	1,891	0.00%
Solar*	634	0.00%

* No change for wind and solar

- Summer Peak Load
  - Summer Peak Load will be modeled consistent with the 2018 PJM Load Forecast Report
  - The final load forecast released in December 2017
  - Include Demand Response (DR) and Energy Efficiency (EE) based on what cleared in the 2020/21 BRA

- Winter Peak Load
  - Winter Peak Load will be modeled consistent with the 2018 PJM Load Forecast Report

- Light Load
  - Modeled at 50% of the Peak Load forecast per M14B
    - Will continue to pursue a load adjustment through the Planning Committee
  - The Light Load Reliability Criteria case will be modeled consistent with the procedure defined in M14B

- Load Management, where applicable, will be modeled consistent with the 2018 Load Forecast Report
  - Used in LDA under study in load deliverability analysis

- All existing generation expected to be in service for the year being studied will be modeled.

- Future generation with a signed Interconnection Service Agreement, or that cleared in the 2020/21 BRA, will be modeled along with any associated network upgrades.

  - Generation with a signed ISA will contribute to and be allowed to back-off problems.

- Generation with an executed Facilities Study Agreement (FSA) will be modeled offline along with any associated network upgrades, which will be examined separately.

- Generation with an FSA will be modeled consistent with the procedures noted in Manual 14B
  - Exceptions to those procedures will be vetted with stakeholders at a future TEAC

- Generation with an executed FSA will be modeled offline but will be allowed to contribute to problems in the generation deliverability testing.
  - Generation with an executed FSA will not be allowed to back-off problems.

- Additional generation information (i.e. machine lists) will be posted to the TEAC page.

- Queue projects with an FSA or ISA but are not included in 2018 Series RTEP cases
  - S58 (MTX) Collins "Rock Island Clean Line"
    - 1,600 MW total
    - 1200 non-firm and 400 firm
  - X3-028 (MTX)
    - 2000 non-firm and 1500 firm
  - Y3-092 (MTX)
    - 500 non-firm and 500 firm

- Generation that has officially notified PJM of deactivation will be modeled offline in RTEP base cases for all study years after the intended deactivation date

- RTEP baseline upgrades associated with generation deactivations will be modeled

- Retired units Capacity Interconnection Rights are maintained in RTEP base cases for 1 year after deactivation at which point they will be removed unless claimed by an interconnection queue project

- At a minimum, all PJM bulk electric system facilities, all tie lines to neighboring systems and all lower voltage facilities operated by PJM will be monitored.

- At a minimum, contingency analysis will include all bulk electric system facilities, all tie lines to neighboring systems and all lower voltage facilities operated by PJM.

- Thermal and voltage limits will be consistent with those used in operations.

- PJM/NYISO "ConEd" Wheel Cancellation
  - The ConEd wheel will not be modeled in the 2018 RTEP due to the cancellation of the corresponding transmission service in 2017.
  - Scheduled MW across the PJM/NYISO PARs will be set according to the procedures in Manual 14B that were approved in 2017.
- Linden VFT
  - Modeled at 330 MW
- HTP
  - Modeled at 0 MW

- As part of the 24-month RTEP cycle, a year 8 (2026) base case will be developed and evaluated as part of the 2018 RTEP

- The year 8 case will be based on the 2023 Summer case that will be developed as part of this year's 2018 RTEP
  - The case will be updated to be consistent with the 2018 RTEP assumptions.

- Purpose: To identify and develop longer lead time transmission upgrades

- Similar to the 2017 RTEP and per the PJM Operating Agreement, a proposal window will be conducted for all reliability needs that are not Immediate Need reliability upgrades or are otherwise ineligible to go through the window process.

- FERC 1000 implementation will be similar to the 2017 RTEP.
  - Advance notice and posting of potential violations
  - Advance notice of window openings
  - Window administration

- Request stakeholder suggestions for and input to 2018 alternative sensitivity studies and scenario analysis.

- PJM 2018 scenario and sensitivity discussion:
  - Light load scenario and sensitivity studies including a minimum load level study to support the development of light load test
  - Gas / Electric interface studies